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of the Zodiacal Light. And this glowing cone of light is far more brilliant here than at any observatory in the Eastern States.

Altogether the observation seems to have been quite satisfactory under the existing conditions.

MOUNT LOWE (CAL.) OBSERVATORY, May 17, 1901.

# PLANETARY PHENOMENA FOR JULY AND AUGUST, 1901.

BY MALCOLM MCNEILL.

## JULY.

The Earth is in aphelion July 4, 8 A.M. P. S. T.

*Mercury* is an evening star at the beginning of the month, too near the Sun to be seen. It rapidly approaches the Sun, passes inferior conjunction on the morning of July 13th, and then rapidly recedes from the Sun. It may be seen as a morning star during the last few days of the month in the early twilight.

*Venus* is gradually increasing its distance from the Sun, and is beginning to be conspicuous as an evening star. During most of the month it sets rather more than an hour after sunset. It moves about 40° east and 11° south through *Cancer* into *Leo.* On July 28th it passes about 1° north of *Regulus.*

*Mars* is in the western sky in the evening, setting a little before 10 P.M. at the end of the month. Its rate of recession from the Earth is still over twenty millions of miles per month, and on July 31st its distance from us is about one hundred and sixty-three millions of miles. Its apparent motion among the stars is 16° east and 7° south from *Leo* into *Virgo.* On the evening of July 6th it passes very close, less than 20′, south of the fifth-magnitude star *β Virginis.*

*Jupiter* and *Saturn* are still close together in *Sagittarius*, and as they are both near opposition, they are above the horizon practically the entire night. *Jupiter* was in opposition on June 30th, and *Saturn* will be in opposition on July 5th. Both are moving westward. *Jupiter* not quite 4° and *Saturn* rather more than 2°, and at the end of the month are about 7° apart, *Jupiter* being west of *Saturn.*

*Uranus* is about two hours' motion west of *Saturn*, and sets two hours earlier. It is still in the southern extension of *Ophiuchus*, and moves about 1° westward during the month. There is no bright star near it to mark its position, but at the beginning of the month it is about half a degree north of the sixth-magnitude star *24 Ophiuchi.* Its motion during the month carries it away from the star.

*Neptune* is a morning star too near the Sun for good observation.

## AUGUST.

*Mercury* is a morning star at the beginning of the month, passing greatest west elongation on the morning of August 2d. It then rises about an hour and a half before sunrise, and the interval is more than an hour until about the middle of the month. After that the planet rapidly approaches the Sun and passes superior conjunction on the afternoon of August 27th.

*Venus* is an evening star, setting rather more than an hour after sunset throughout the month. It increases its apparent distance from the Sun from 25° to 32°, but at the same time the planet draws more and more south from the Sun, so that the interval between the settings of the Sun and planet remains practically the same. The planet moves 33° east and 15° south during the month, going from *Leo* into *Virgo.*

*Mars*, at the beginning of the month, is in just about the position *Venus* will occupy at the end. Its rate of recession from the Earth is not quite as great as for two or three months past, being only fourteen millions of miles. On August 31st it is not quite twice the mean distance of the Earth from the Sun distant from us. It has ceased to be a conspicuous object, but will still be about as bright as the standard first-magnitude star. It moves through the constellation *Virgo* 18° east and 7° south. On August 18th it passes about 2° north of the first-magnitude star *Spica*, *α Virginis.* Its brightness will then differ little from that of the star, but its ruddy color will make it readily distinguishable.

*Jupiter* and *Saturn* still keep their positions in *Sagittarius* north of the group called the "Little Dipper." They are setting earlier, and by the end of the month do not remain above the horizon much after midnight. They still keep up their retrograde motion toward the west, but more slowly than before; and *Jupiter* becomes stationary just before the end of the month, while *Saturn* does not reach his turning-point until a fortnight later. Their distance apart remains pretty constantly a little more than 7°, and each moves about a degree and a half westward among the stars.

*Uranus* sets about two hours earlier than during July. It retrogrades slowly until August 22d, when it becomes stationary, and then begins its eastward motion.

*Neptune* is a morning star, but by the end of the month rises a little after midnight.

Look out for meteors during the middle of the month, more especially the nights from August 11th to 13th. This shower, which comes yearly, radiates from the constellation *Perseus.* This rises in the northeast in the early evenings. More meteors are likely to be seen after midnight than before.

## JULY–AUGUST, 1901.

### PHASES OF THE MOON, P. S. T.

| | | | |
|---|---|---|---|
| Full Moon . . . | July 1, | 3h 18m | P. M. |
| Last Quarter . . . | July 8, | 7 20 | |
| New Moon . . . | July 15, | 2 10 | A. M. |
| First Quarter . . . | July 23, | 5 58 | |
| Full Moon . . . | July 31, | 2 34 | |
| Last Quarter . . . | Aug. 7, | 12 2 | |
| New Moon . . . | Aug. 14, | 12 27 | |
| First Quarter . . . | Aug. 21, | 11 52 | P. M. |
| Full Moon . . . | Aug. 29, | 12 21 | |

### THE SUN.

| 1901. | | R. A. | Declination. | Rises. | Transits. | Sets. |
|---|---|---|---|---|---|---|
| July | 1, | 6h 39m | + 23° 9′ | 4h 39m A.M. | 12h 3m P.M. | 7h 27m P.M. |
| | 11, | 7 20 | + 22 11 | 4 46 | 12 5 | 7 26 |
| | 21, | 8 0 | + 20 34 | 4 53 | 12 6 | 7 19 |
| Aug. | 1, | 8 44 | + 18 9 | 5 3 | 12 6 | 7 9 |
| | 11, | 9 22 | + 15 25 | 5 11 | 12 5 | 6 59 |
| | 21, | 10 0 | + 12 17 | 5 21 | 12 3 | 6 45 |
| | 31, | 10 36 | + 8 49 | 5 30 | noon | 6 30 |

### *MERCURY.*

| | | | | | | |
|---|---|---|---|---|---|---|
| July | 1, | 7 50 | + 18 25 | 6 9 A.M. | 1 14 P. M. | 8 19 P.M. |
| | 11, | 7 31 | + 17 6 | 5 17 | 12 16 | 7 15 |
| | 21, | 7 10 | + 18 0 | 4 12 | 11 15 A.M. | 6 18 |
| Aug. | 1, | 7 22 | + 20 3 | 3 34 | 10 45 | 5 56 |
| | 11, | 8 18 | + 20 3 | 3 50 | 11 1 | 6 12 |
| | 21, | 9 36 | + 16 2 | 4 44 | 11 40 | 6 36 |
| | 31, | 10 52 | + 9 0 | 5 45 | 12 16 P. M. | 6 47 |

## *Venus.*

| 1901. | R. A. | Declination. | Rises. | Transits. | Sets. |
|---|---|---|---|---|---|
| July 1, | 7 51 | + 22 22 | 5 54 A.M. | 1 15 P.M. | 8 36 P. M. |
| 11, | 8 42 | + 19 49 | 6 17 | 1 27 | 8 37 |
| 21, | 9 31 | + 16 20 | 6 40 | 1 37 | 8 34 |
| Aug. 1, | 10 23 | + 11 42 | 7 6 | 1 46 | 8 26 |
| 11, | 11 8 | + 6 56 | 7 27 | 1 51 | 8 15 |
| 21, | 11 53 | + 1 53 | 7 49 | 1 56 | 8 3 |
| 31, | 12 36 | — 3 17 | 8 11 | 2 0 | 7 49 |

## *Mars.*

| | | | | | |
|---|---|---|---|---|---|
| July 1, | 11 36 | + 3 15 | 10 48 A.M. | 5 0 P.M. | 11 12 P.M |
| 11, | 11 56 | + 0 54 | 10 38 | 4 41 | 10 44 |
| 21, | 12 17 | — 1 32 | 10 27 | 4 22 | 10 17 |
| Aug. 1, | 12 40 | — 4 15 | 10 16 | 4 2 | 9 48 |
| 11, | 13 3 | — 6 46 | 10 8 | 3 45 | 9 22 |
| 21, | 13 26 | — 9 16 | 10 1 | 3 29 | 8 57 |
| 31, | 13 51 | — 11 44 | 9 54 | 3 14 | 8 34 |

## *Jupiter.*

| | | | | | |
|---|---|---|---|---|---|
| July 1, | 18 35 | — 23 10 | 7 26 P.M. | 12 2 A.M. | 4 38 A.M. |
| Aug. 1, | 18 20 | — 23 25 | 5 5 | 9 40 P. M. | 2 15 |
| Sept. 1, | 18 14 | — 23 31 | 2 59 | 7 33 | 12 7 |

## *Saturn.*

| | | | | | |
|---|---|---|---|---|---|
| July 1, | 18 58 | — 22 18 | 7 45 P.M. | 12 25 A.M. | 5 5 A.M |
| Aug. 1, | 18 49 | — 22 33 | 5 30 | 10 9 P.M. | 2 48 |
| Sept. 1, | 18 43 | — 22 43 | 3 24 | 8 2 | 12 40 |

## *Uranus.*

| | | | | | |
|---|---|---|---|---|---|
| July 1, | 16 50 | — 22 30 | 5 35 P.M. | 10 14 P.M. | 2 53 A.M |
| Aug. 1, | 16 47 | — 22 24 | 3 29 | 8 8 | 12 47 |
| Sept. 1, | 16 46 | — 22 23 | 1 26 | 6 5 | 10 44 |

## *Neptune.*

| | | | | | |
|---|---|---|---|---|---|
| July 1, | 5 57 | + 22 18 | 4 2 A.M. | 11 22 A.M. | 6 42 P.M. |
| Aug. 1, | 6 2 | + 22 18 | 2 4 | 9 24 | 4 44 |
| Sept. 1, | 6 5 | + 22 17 | 12 6 | 7 26 | 2 46 |

## ECLIPSES OF *JUPITER'S* SATELLITES, P. S. T.

(Off right-hand limb as seen in an inverting telescope.)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| II, R, | July | 2, | $9^h$ | $13^m$ | P.M. | II, R, | Aug. | 3, | $8^h$ | $57^m$ | P.M. |
| I, R, | | 5, | 2 | 37 | A.M. | III, D, | | 4, | 9 | 37 | |
| I, R, | | 6, | 9 | 6 | P.M. | III, R, | | 5, | 12 | 37 | A.M. |
| IV, R, | | 7, | 12 | 51 | A.M. | I, R, | | 5, | 11 | 13 | P.M. |
| II, R, | | 9, | 11 | 49 | P.M. | I, R, | | 7, | 5 | 42 | |
| I, R, | | 12, | 4 | 32 | A.M. | II, R, | | 10, | 11 | 34 | |
| I, R, | | 13, | 11 | 0 | P.M. | III, D, | | 12, | 1 | 37 | A.M. |
| I, R, | | 15, | 5 | 29 | | I, R, | | 13, | 1 | 8 | |
| II, R, | | 17, | 2 | 25 | A.M. | I, R, | | 14, | 7 | 37 | P.M. |
| I, R, | | 21, | 12 | 55 | | I, R, | | 21, | 9 | 32 | |
| I, R, | | 22, | 7 | 24 | P.M. | I, R, | | 23, | 4 | 0 | |
| IV, D, | | 23, | 4 | 38 | | II, R, | | 28, | 6 | 8 | |
| IV, R, | | 23, | 7 | 3 | | I, R, | | 28, | 11 | 27 | |
| II, R, | | 27, | 6 | 20 | | I, R, | | 30, | 5 | 55 | |
| III, R, | | 28, | 8 | 36 | | | | | | | |
| I, R, | | 29, | 9 | 18 | | | | | | | |